

Collaborative writing tasks in the L2 classroom: Comparing group, pair, and individual work

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Abstract

This study investigates the benefits of collaborative writing tasks. Previous research from the perspective of the sociocultural theory of mind suggests that writing tasks completed in pairs offer learners an opportunity to collaborate in the solution of their language-related problems, co-construct new language knowledge, and produce linguistically more accurate written texts. Building on this research, the present study compares the performance of the same writing task by groups of four learners ($n = 15$), pairs ($n = 15$), and individual learners ($n = 21$). It examines the effect of the number of participants on the fluency, complexity, and accuracy of the written texts produced, as well as the nature of the oral interaction between the pairs and the groups as they collaborate throughout the writing process. The analysis of interaction focused on language-related episodes (LREs) reveals that although both groups and pairs focused their attention on language relatively often, groups produced more LREs and a higher percentage of correctly resolved LREs than pairs. As a result, the texts written by the groups were more accurate not only than those written individually, but also than those written in pairs. The implications of these results for the understanding of both collaborative writing tasks and collaborative problem solving activity are discussed.

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Pair and small group activities constitute one of the most common practices in communicative second language (L2) classrooms, theoretically supported by both psycholinguistic and sociocultural perspectives on L2 acquisition. In writing classes, group work has tended to be limited to brainstorming and peer review activities. But in recent years, a number of studies have called attention to the benefits of collaborative writing tasks, which require learners to work in pairs throughout the entire writing process (e.g., Storch, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009). Research from a sociocultural perspective suggests that collaborative writing activities push learners to reflect on their language use and work together in the solution of their language-related problems (Swain, 2000, 2001). By pooling their linguistic resources to solve the problems encountered, learners engage in language-mediated cognitive activities that are thought to facilitate the co-construction of language knowledge and a higher level of performance (Donato, 1994; Ohta, 2001; Swain, 2000; Swain & Lapkin, 1998). This research has also provided evidence that collaborative dialogue, the dialogue that occurs between learners as they collaborate to solve linguistic problems, mediates L2 learning (e.g., Kim, 2008; Lapkin, Swain, & Smith, 2002; Storch, 2002; Swain, Brooks, & Tocalli-Beller, 2002; Swain & Lapkin, 1998, 2002).

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Although small group activities are rather frequent in the classroom, the study of collaborative dialogue has mostly focused on dyadic learner–learner interaction. Similarly, a significant number of studies have compared pair and individual work on writing tasks (Storch, 1999, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009), but little attention has been paid to groups of more than two learners in relation to these tasks. Furthermore, no study has been specifically set up to compare pairs and small groups as they complete the same writing assignment. Therefore, a still unresolved issue is how the number of participants in the task may affect the process and product of collaborative writing. The present study addresses this question. It compares groups of four learners, dyads, and individual learners as they perform the same writing task. It analyzes the effect that the number of participants may have on the accuracy, fluency, and complexity of the written texts produced, as well as the nature of the interaction between the pairs and the groups as they collaborate throughout the writing process. The study intends to contribute to our understanding of both collaborative dialogue and collaborative writing, and, in this way, shed new light on the role of collaborative writing tasks in the L2 classroom.

Literature review

Peer collaboration and L2 learning

The sociocultural theory of mind emphasizes the role of interaction and peer collaboration in L2 development. From a sociocultural lens, learning is a socially situated activity. Higher cognitive functions appear first on the social, intermental plane, and only later on the psychological, intramental plane (Vygotsky, 1978). Learners, *novices*, construct knowledge in collaboration with more capable individuals, *experts*. Language is the semiotic tool mediating this process and learning is the gradual internalization of the socially constructed knowledge.

Researchers applying sociocultural theory to the study of L2 learning maintain that learners can have a positive impact on each other's development because they can act as both novices and experts (e.g., Antón & DiCamilla, 1998; Donato, 1994; Ohta, 2000, 2001; Storch, 2002; Swain & Lapkin, 1998). Because no two learners have the same strengths and weaknesses, when working together, they can provide scaffolded assistance to each other and, by pooling their different resources, achieve a level of performance that is beyond their individual level of competence (Ohta, 2001).

However, not all pair and group work is equally conducive to learning. From this perspective, interaction facilitates learning when there is collaboration; that is, when learners work together, sharing ideas and pooling their knowledge, to achieve one common goal.¹ The analysis of peer–peer interaction as an opportunity for collaborative dialogue (Swain, 2000) has revealed that, when learners share responsibility for the written or oral product of the task at hand, they tend to collaborate in the solution of their language problems. To this end, they engage in language-mediated cognitive activities, such as formulating and testing hypotheses, offering and assessing new input, or correcting themselves or others. This use of language as a cognitive tool to reflect on language and mediate problem-solving has been named *linguaging* (Swain, 2006). Swain claims that linguaging, defined as “the process of making meaning and shaping knowledge and experience through language” (Swain, 2006, p. 89), is a source of L2 learning.

In the last decade a considerable number of studies framed in this approach have examined learner–learner interaction focusing on language-related episodes (LREs). LREs are defined as “any part of a dialogue where the students talk about the language they are producing, question their language use, or correct themselves or others” (Swain & Lapkin, 1998, p. 326). The collaborative dialogue that occurs in LREs, as learners collaborate to solve grammatical and lexical difficulties, constitutes an example of linguaging (Swain & Watanabe, 2012). The analysis of LREs confirms that, by pooling their individual resources, learners are quite often able to reach correct solutions to their language-related problems and co-construct new language knowledge (e.g., Leaser, 2004; Storch, 2007; Swain & Lapkin, 1998, 2002; Williams, 2001). Some studies have also provided evidence that this knowledge tends to be retained by the learner, who becomes “able to use the language of others (and the mental process that interaction has constructed)” (Swain & Lapkin, 1998, p. 321). These studies confirm that the collaborative dialogue we observe in LREs represents language learning in progress (see, among others, Kim, 2008; Lapkin et al., 2002; Storch, 2002; Swain et al., 2002; Swain & Lapkin, 1998, 2002; Watanabe & Swain, 2007; Williams, 2001; Zeng & Takatsuka, 2009).

¹ See Strauss (2007) for a detailed discussion of the differences between collaborative and cooperative work.

Some research has also been conducted on the variables and conditions that affect LRE production and subsequent L2 learning. Attention has been paid to the influence of task type (e.g., [Alegría de la Colina & García Mayo, 2007](#); [Nassaji & Tian, 2010](#); [Storch, 1999](#); [Swain & Lapkin, 2001](#)) and to sociocultural and individual factors, such as the learners' proficiency level (e.g., [Kim & McDonough, 2008](#); [Leeser, 2004](#); [Watanabe & Swain, 2007, 2008](#); [Williams, 1999](#)). Evidence has also been found of a mixed effect of collaborative dialogue on grammar, suggesting that not all grammatical structures can benefit from collaboration ([Storch, 1999](#)) and not all LREs are equally conducive to learning ([Storch, 2008](#)). Much research needs yet to be done before we can reach a comprehensive understanding of the opportunities that collaborative dialogue may offer for L2 development.

Collaborative writing tasks

A substantial amount of research in the field of L2 acquisition has been looking at the effect of task design on L2 performance and learning. Most of this research has been conducted from a cognitive perspective, focusing on the effect of task complexity on L2 production—measured in terms of accuracy, fluency, and syntactic complexity (see, for instance, [Bygate, Skehan, & Swain, 2001](#); [Ellis, 2003](#); [García Mayo, 2007](#)). But some attention has also been paid to the influence of task design on focus on form, feedback, and collaborative dialogue. This research has found that collaborative tasks, such as dictogloss and jigsaw tasks,² are particularly useful to promote peer collaboration and LREs (e.g., [Alegría de la Colina & García Mayo, 2007](#); [Kim, 2009](#); [Storch, 1998, 1999](#); [Swain & Lapkin, 1998, 2001](#)).

As described by [Swain \(2001\)](#), collaborative tasks are communicative tasks in the sense that they involve “learners in comprehending, manipulating, producing, or interacting in the target language while their attention is principally focused on meaning rather than form” ([Nunan, 1989](#), p. 10). But collaborative tasks require also that learners work in pairs or groups to produce one jointly written text. The joint writing activity pushes learners to reflect on language, discuss the language they are using, and collaborate in the solution of the linguistic problems they encounter, which results in LREs. Sociocultural researchers claim that, by promoting LREs, collaborative tasks facilitate L2 learning.

Building on this research, a number of studies have investigated the benefits of collaborative writing by comparing collaborative and individual tasks, that is, learners performing the same writing tasks in pairs and alone. In 1999, [Storch](#) analyzed the impact of collaboration on grammatical accuracy across three different tasks: a cloze exercise, a text reconstruction task, and a composition task. The students who worked in pairs and had an opportunity to discuss their grammatical choices took longer to complete the tasks, but produced more accurate written texts than those working alone. Their compositions were shorter and less syntactically complex, but overall more accurate.

In a series of subsequent studies, involving intermediate to advanced level learners of English as a L2, [Storch and Wigglesworth](#) examined the effects of collaboration by analyzing not only the written texts produced but also the nature of the writing process. [Storch \(2005\)](#) compared dyadic and individual performance on a short composition task based on a graphic prompt. Pairs spent more time on the task and produced shorter texts, but these were syntactically more complex and grammatically more accurate than those written individually. Only seven pairs and five individual learners participated in the study, which might explain why the differences observed were not statistically significant. However, the analysis of the oral interactions between the dyads confirmed that pair work afforded learners an opportunity to collaborate on the writing process, pool their ideas and knowledge, and provide each other with immediate feedback on language.

In a similar but larger scale study, [Storch and Wigglesworth \(2007\)](#) compared the performance of 24 pairs and 24 individual learners on two writing tasks, a report and an argumentative essay. More recently, [Wigglesworth and Storch \(2009\)](#) compared 24 pairs and 48 individual learners writing an argumentative essay. In both studies pairs were assigned more time to complete the task than individual learners. The two studies obtained similar results: No differences were found in terms of fluency and complexity, but the texts written in pairs were significantly more accurate than those written individually. The pair dialogues were also analyzed and evidence was found of

² A dictogloss is a task in which a text is read out loud, usually two or three times. Learners are asked to take notes while listening and then to reconstruct the original text, either individually or in pairs. In jigsaw tasks each learner holds a different piece of information. Typically, two students are given two different sets of numbered pictures and asked to put them together to construct a story.

collaboration on different aspects of the writing process and grammatical as well as lexical and mechanical LREs. The authors concluded that this collaboration explains why pairs tended to produce linguistically more accurate texts. Wigglesworth and Storch (2009) also discussed the impact that collaborative writing tasks may have in the L2 assessment context.

Storch and Wigglesworth's studies were not set to examine the relationship between collaboration and L2 acquisition, but similar studies by Kuiken and Vedder (2002), Kim (2008), and Nassaji and Tian (2010) were specifically designed to investigate this issue. In Kim (2008), (32) Korean L2 learners were asked to complete a dictogloss task. Half of them completed the task in pairs and the other half individually while thinking aloud. Individual learners thinking aloud produced a similar number of LREs than learners working in pairs, but the latter performed better in both immediate and delayed vocabulary posttests. Kuiken and Vedder (2002) obtained some contradictory results. Their study, conducted in an English as a foreign language context, compared the effect of individual and small group work during a dictogloss task on the acquisition of the passive form. In contrast to Kim (2008), no positive relationship was found between collaboration and learning. More recently, Nassaji and Tian (2010) compared individual and collaborative work across two different tasks—a cloze task and an editing task—in an English as a L2 context. Learners working in pairs completed the tasks more accurately than learners working alone. But the results of the vocabulary pre- and posttests did not provide clear evidence of greater knowledge gains for the collaborative condition.

In sum, research comparing collaborative and individual writing has been able to provide evidence of a positive effect for collaboration on task performance, which supports the use of collaborative writing tasks in both second and foreign language classrooms. However, findings in relation to L2 learning are still inconsistent. Since in some language classrooms and particularly in foreign language contexts “writing to learn (language)” can be as important a goal as “learning to write” (Ortega, 2009), further research is still needed to clarify the role and potential learning benefits of collaborative writing tasks.

The present study

The studies reviewed here have operationalized collaborative writing tasks as tasks completed in pairs—Kuiken and Vedder (2002) being an exception. As already mentioned, most research on collaborative dialogue has also examined LREs produced by learners working in dyads rather than groups—some exceptions are Donato (1994), Ewald (2005), and Ohta (2001). In small groups, individual opportunities to speak are inevitably more limited than in pairs. But a larger number of participants also means more linguistic resources. From a sociocultural perspective, which assumes that learners with different weaknesses and strengths can pool their knowledge to scaffold each other, this should facilitate the successful resolution of language-related problems and a higher level of performance. On the other hand, Swain (2001) argued for collaborative tasks to be completed in pairs, on the basis that pair work encourages individual participation. When working in small groups, learners, or at least some learners, may not feel the same pressure to speak and contribute to the completion of the task.

Since no previous study has specifically compared the nature of collaborative dialogue between groups of more than two learners and dyads, how these different factors interact is still an open question. Therefore, we do not know how the number of participants in a writing task may affect, not only the frequency and nature of LREs, but also the quality of the written text produced. This is the issue addressed in the present study. I compared the performance of the same writing task by groups of four learners, pairs, and individual learners. I analyzed the written texts produced and the oral interactions between the groups and the pairs as they collaborated to write their texts, in order to find an answer to the following two questions:

- (1) Does the number of participants in a writing task affect the accuracy, fluency, and complexity of the written texts produced?
- (2) Does the number of participants in the collaborative version of the writing task affect the frequency and nature of the LREs produced?

Since small group activities are relatively frequent in the classroom, if not as frequent as pair activities, this research should provide new insights for our understanding of both collaborative dialogue and collaborative writing tasks with direct implications for the L2 classroom.

Method

Participants

The study was conducted in six intermediate level classes of Spanish as a foreign language at a large, public university in the United States. A total of 111 students volunteered to participate in the project. Eighty-three were female and 28 male, and their ages ranged from 18 to 30, with an average of 20. They were all English native speakers or had a native-like command of English.

All the participants were enrolled in the same second-year Spanish language course. They had been placed in this course after successful completion of the previous level class, or on the basis of their score on either the AP Spanish language exam or the university placement test. Since most of them had taken Spanish language classes before entering university, they had been studying Spanish for an average of three and a half years. On this basis, they were all considered to have an intermediate proficiency level.

Six classes of the same course were randomly selected for the study. Each class was taught by a different teacher, but with the same syllabus, as well as teaching and evaluation materials. In one of the classes learners worked individually. In the other five classes they worked either in pairs or in groups of four.³ In total, 21 learners worked individually, 30 in pairs, and 60 in groups of four. There were therefore 15 dyads and 15 groups.

Instruments and procedure

On the day of data collection learners received a 15-min grammar review lesson focused on the use of Spanish past tenses and, immediately after that, they completed a writing task specifically designed for the purposes of the study. Each pair and group received a set of 15 pictures (see [Appendix A](#)). Learners were instructed to rearrange these pictures in order to create a story, to set the story in the past in order to use past tenses, and to write it down. As in the case of jigsaw tasks used in previous research (e.g., [Alegria de la Colina & García Mayo, 2007](#); [Lapkin et al., 2002](#); [Swain & Lapkin, 1998, 2001, 2002](#)), each pair and each group had to produce one joint written text based on the same set of pictures, but in the present study all the participants had access to all the pictures and just had to agree on how to sequence them. Learners working individually received the same instructions, but were asked to complete the task alone.

The grammar review lesson was intended to orient learners' attention to past tenses and to review those uses of the preterit and the imperfect needed to complete the writing task successfully. Since the choice between the preterit and the imperfect represents a common difficulty for English-speaking learners of Spanish, the task was expected to create frequent grammar problems and in this way prompt grammatical as well as lexical LREs.

So that learners would perceive both the writing task and the grammar review lesson as part of their everyday class work, they were presented by their teachers during a regular class. I elaborated all the materials to be used in the class and a set of detailed written instructions for the teachers. I also met with them twice to discuss these materials and make sure they would all follow the same procedure and give the same instructions to their students.

Data was collected in the seventh week of the course, so that learners were familiar with each other and used to working together in groups. Both pair and small group work were a very common practice in these classes. Students were allowed to choose their partners, but they were encouraged to work in mixed-sex groups in order to facilitate voice identification and the transcription of the data. Still, because of the larger number of female learners, most of the pairs and five of the groups were composed only of females. Teachers also made sure there was a similar number of pairs and groups in each class.⁴

Since all the classes followed the same procedure, all the learners were allowed the same amount of time to complete the task, approximately 30 min. Learners working in pairs and small groups received a digital voice recorder to be placed in the middle of the group. The data collected included 722 min of audio-recorded oral interaction and 51 written texts: 15 texts written in groups, 15 texts written in pairs, and 21 individually written texts.

³ All the groups consisted of four learners. This number was chosen to establish a clear difference between groups and pairs, while keeping groups small enough so that all the members could get enough opportunities to participate. It also reflects a common practice within the classes where the data was collected.

⁴ Those learners who did not volunteer to participate in the project performed the same classroom activities, but working in different pairs and groups, and without a voice recorder. In most classes, all the learners volunteered for the study.

Data coding and analysis

The oral interactions between the pairs and the groups as they collaborated to complete the task were transcribed and analyzed for LREs. Following previous research, these LREs were classified according to their focus as either form-focused, lexis-focused, or mechanics-focused, and according to their outcome as correctly resolved, unresolved, or incorrectly resolved. The written texts produced by the pairs, the groups, and the individual learners were analyzed for accuracy, fluency, and complexity.

Coding language-related episodes

Following Swain and Lapkin (1998, p. 326), an LRE was identified whenever the students explicitly focused their attention on language, questioning their language use or correcting themselves or others. When learners deliberated over grammar, the LRE was classified as form-focused. The choice of verb tense, as illustrated in Example 1, together with the use of prepositions and gender agreement issues, were the most frequently discussed grammatical difficulties in both pair and small group interaction.

In the first example, a group of four learners is questioning whether the verb *hablar* (to talk) should be used in the preterit, *habló*, or the imperfect, *hablaba*—turn 1. The first two learners, Amy and Rob, articulate what they believe to be the grammatical rule that applies in this context, that is, because the action happened only once—turn 1, it is not a repetitive or ongoing action—turns 3 and 4, the preterit tense should be used—turn 6. The group agrees on the form *habló*, which appears in their jointly written text. Working together they reach a correct solution to the grammatical problem encountered.

Example 1. Form-focused LRE

Small group interaction:

- 1 Amy: **hablaba o habló?** con ... el agente ... **habló**, porque: ... él uh ... hice ... la cosa un tiempo
[he talked (imperfect) or he talked (preterit)? to ... the agent ... he talked (preterit), because ... he uh ... did ... the thing once]
- 2 Rob: hmmm?
- 3 Amy: **porque no es un: acción** ... repetitive
[because it is not a ... repetitive action]
- 4 Rob: ongoing?
- 5 Amy: **sí**
[yes]
- 6 Rob: **habló**
[he talked (preterit)]
- 7 Jim: **creo que habló**
[I think that he talked (preterit)]
- 8 Amy: **ha:bló**
[he talked (preterit)]

Written text:

“El hombre **habló** con el agente”

[The man talked to the agent]

Lexis-focused LREs are segments of interaction in which learners question the meaning of a word, discuss the choice between two alternative lexical items, or, as we see in Example 2, search for new vocabulary. The pauses, lengthening, and rising intonation in Rosie's first turn indicate she is having trouble remembering the word *ship* in Spanish. Another learner, Tori, offers the word *barco*—turn 2, which is immediately accepted and incorporated into the written text. With the collaborative help of Tori, Rosie becomes able to use the lexical item *barco*—see turn 3.

Example 2. Lexis-focused LRE.

Pair interaction:

- 1 Rosie: **querían:** e:h ... e:h **querían ir en un: ship?**
[they wanted eh... eh they wanted to go by ship]
- 2 Tori: **barco?**
[ship?]
- 3 Rosie: **barco!** heh **sí**
[ship! heh yes]
- 4 Tori: **sí**
[yes]

Written text:

“*Querían ir en **barco***”

[They wanted to go by ship]

In mechanics-focused LREs, learners deal with pronunciation, spelling, accentuation, or punctuation problems. In Example 3, Jackie is incorrectly writing *cervesas* instead of *cervezas* (beers). The other learners in the group correct her spelling mistake.

Example 3. Mechanics-focused LRE.

Small group interaction:

1 Jackie: *cer:ve:zas:?*
[beers?]

2 Jenny: *efe* heh heh
[ef heh heh]

3 Nancy: ***zeta***
[zee]

4 Adam: ***zeta***
[zee]

5 Jenny: oh! ***zeta*** *sí*
[oh! zee yes]

6 Jackie: *cervezas!* ok
[beers! ok]

Written text:

“*Ella tomaba muchas **cervezas***”

[She was drinking lots of beers]

All the previous LREs constitute instances of correctly resolved episodes. Two or more learners working together reach a correct solution to the linguistic problem encountered and make a correct decision about the language to be used in their written text. But learners are not always able to find a solution to their problems. In Example 4, a group of four learners is looking for the third-person singular preterit form of the verb *volar* (to fly). They verbalize different alternatives, such as *volió*, *vulió*, or *vuelió*—turns 2 to 9, but not the correct form, *voló*. In the end, unable to find a form they can agree on, they decide to use the verb *salir* (to leave) instead of *volar*—see turns 11 and 12. This is considered an unresolved LRE.

Example 4. Unresolved form-focused LRE.

Small group interaction:

1 Mae: uh *cómo se dice u:h **volar en el ...** pretérito?*
[uh how do you say uh to fly in the”. preterit?]

2 Carla: u:h ***vu-***
[uh fl-]

3 Beth: ***vu:l-***
[fl-]

4 Mae: ***volió?***
[he flew? (incorrect verb form)]

5 Carla: ***vulió?***
[he flew? (incorrect verb form)]

6 Mae: ***vulió?***
[he flew? (incorrect verb form)]

7 Beth: ***vuelio? volió?***
[he flew? he flew? (incorrect verb forms)]

8 Carla: ***vo-***
[fl-]

9 Beth: ***vo- vuelio*** makes no sense, *pero ...*
[fl- he flew (incorrect verb form) makes no sense, but...]

10 Carla: heh heh heh
[...]

11 Beth: *o **salió** ... la ciudad*
[or he left ... the city]

12 Carla: ***salió** sí*
[he left yes]

Written text:

“***Salió** la ciudad y su contaminación*”

[He left the city and its pollution]

LREs can also be incorrectly resolved. In Example 5, two learners question whether *avión* (plane) needs a masculine or a feminine article—turns 1 and 2. They agree on the use of the feminine article, *una*—turns 4 and 5, but this is an incorrect solution since *avión* is a masculine noun.

Example 5. Incorrectly resolved form-focused LRE.

Pair interaction:

- 1 Tom: *en un avión en un ... sí?*
 [in a (masculine) plane in a (masculine) ... yes?]
- 2 Angie: *ión is mm la, I think*
 [ion (word ending) is mm the (feminine), I think]
- 3 Tom: *sí*
 [yes]
- 4 Angie: so it'd be *una*
 [so it'd be a (feminine)]
- 5 Tom: oh! *en una avión.*
 [oh! in a (feminine) plane.]

Written text:

“Envió Miguel a Nueva York *en una avión*”

[He sent Miguel to New York by plane]

As illustrated in the previous examples, the LREs identified in the data often involved several turns, but they varied in length. When two different aspects were discussed, such as the lexical choice of a verb and its form, two LREs were coded. On the other hand, interrupted LREs were counted as one single episode. This happened when learners discussed the same problem on different occasions. Following these guidelines, two independent raters coded all the data collected. Interrater reliability was 92% for LRE identification and 96% for LRE classification. All differences were discussed until complete agreement was reached.

Independent-samples Mann–Whitney *U* Tests were used to compare the frequency and nature of LREs in pair and small group interaction. Alpha was set at 0.05.

Analysis of written texts in terms of accuracy, fluency, and complexity

Following similar previous research (Storch, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009), both collaboratively and individually written texts were analyzed for accuracy, fluency, and syntactic as well as lexical complexity.

Fluency, that is, the length of the text, was measured by the total number of words produced. Clauses and T-units were identified, and three different measures of syntactic complexity were calculated: number of words per clause, number of words per T-unit, and number of clauses per T-unit. Norris and Ortega (2009) argue for the combined use of these three different measures, since they gauge three different subconstructs: subclausal complexity, overall complexity, and complexity via subordination.

In order to consider learners' use of vocabulary together with syntactic complexity (see Skehan, 2009), a mean segmental type-token ratio was calculated. The texts were divided into segments of 50 words each and the mean type-token ratio for all the segments was calculated (see Ellis & Barkhuizen, 2005).

Finally, the texts were analyzed for linguistic accuracy. Most previous research has focused on grammatical and lexical errors, ignoring spelling and punctuation problems. However, since the study of LREs has found that learners working collaboratively discuss mechanical as well as grammatical and vocabulary problems (e.g., Storch, 2007, 2008; Storch & Wigglesworth, 2007, 2010; Wigglesworth & Storch, 2009), in the present study all three types of errors were identified. The ratios of error-free clauses to total clauses, error-free T-units to total T-units, and errors to words were calculated. These three measures of accuracy were selected in order to make the results comparable to those of previous research (e.g., Storch, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009).

The Independent-samples Mann–Whitney *U* Test was conducted in the comparative analyses performed between (1) groups and pairs, (2) groups and individuals, and (3) pairs and individuals. Using the Bonferroni correction method, the level of significance was adjusted at $p < .017$ to counteract the multiple comparisons problem. Results with significant levels between $.017 < p < .05$ were considered to be marginally significant.

Results

I now present the results of the quantitative and qualitative analyses conducted in relation to the two questions that prompted the study: (1) Does the number of participants in a writing task affect the accuracy, fluency, and complexity of the written texts produced? And (2) does the number of participants in the collaborative version of the writing task affect the frequency and nature (i.e., focus and outcome) of the LREs produced?

Research question 1

In we see the results of the accuracy analysis of the texts written by the 15 groups, the 15 pairs, and the 21 individual learners. Clear differences can be observed between the groups and the pairs, as well as the groups and the individual learners (Table 1).

The texts written by the groups obtained better accuracy scores than those written by the pairs on all the measures. The Independent-samples Mann–Whitney *U* Test confirmed that these differences were statistically significant. Groups produced more error-free clauses per clause ($U = 34$, $p = .001$), more error-free T-units per T-unit ($U = 54$, $p = .015$), and fewer errors per word ($U = 194$, $p = .001$) than pairs.

The independent analysis of grammatical, lexical, and mechanical errors, presented in Table 2, confirmed that differences between groups and pairs in the ratio of grammatical errors per word were also statistically significant ($U = 179.5$, $p = .005$). However, differences in the ratio of lexical errors per word were only marginally significant ($U = 169$, $p = .019$) and differences in the ratio of mechanical errors per word were not significant ($U = 145$, $p = .178$) (Table 2).

The comparative analysis of the texts written in groups and those written individually provided very similar results. Statistically significant differences between groups and individuals were found for all the accuracy measures, except

Table 1
Measures of accuracy for texts written in groups, pairs, and individually.

	Groups ($n = 15$)			Pairs ($n = 15$)			Individuals ($n = 21$)		
	Total	Mean	SD	Total	Mean	SD	Total	Mean	SD
Error-free clauses	140	9.33	3.60	76	5.07	3.99	117	5.57	4.84
Error-free clauses per clause		0.36 ^{a,b}	0.11		0.19 ^a	0.13		0.16 ^b	0.13
Error-free T-units	64	4.27	2.43	34	2.27	2.15	62	2.95	3.07
Error-free T-units per T-unit		0.24 ^{a,b}	0.11		0.14 ^a	0.10		0.12 ^b	0.11
Errors	475	31.67	10.81	650	43.33	14.40	1271	60.52	17.94
Errors per word		0.19 ^{a,b}	0.05		0.28 ^a	0.83		0.32 ^b	0.09

^a Statistically significant difference between groups and pairs ($p < .017$).

^b Statistically significant difference between groups and individuals ($p < .017$).

^c Statistically significant difference between pairs and individuals ($p < .017$).

Table 2
Measures of grammatical, lexical, and mechanical accuracy for texts written in groups, pairs, and individually.

	Groups ($n = 15$)			Pairs ($n = 15$)			Individuals ($n = 21$)		
	Total	Mean	SD	Total	Mean	SD	Total	Mean	SD
Grammar errors	244	16.27	5.46	332	22.13	7.01	697	33.19	10.09
Grammar errors per word		0.10 ^{a,b}	0.03		0.15 ^a	0.05		0.18 ^b	0.06
Lexical errors	85	5.67	3.35	138	9.20	4.83	289	13.76	4.76
Lexical errors per word		0.03 ^b	0.02		0.06	0.03		0.07 ^b	0.03
Mechanical errors	146	9.73	5.71	180	12.00	6.60	285	13.57	6.87
Mechanical errors per word		0.06	0.03		0.08	0.03		0.07	0.03

^a Statistically significant difference between groups and pairs ($p < .017$).

^b Statistically significant difference between groups and individuals ($p < .017$).

^c Statistically significant difference between pairs and individuals ($p < .017$).

Table 3
Measures of fluency and complexity for texts written in groups, pairs, and individually.

	Groups (<i>n</i> = 15)			Pairs (<i>n</i> = 15)			Individuals (<i>n</i> = 21)		
	Total	Mean	SD	Total	Mean	SD	Total	Mean	SD
Words	2434	162.27	31.71	2309	153.93 ^c	34.02	4058	193.24 ^c	40.33
Clauses	384	25.60	5.22	363	24.20	6.11	653	31.10	7.78
T-units	253	16.87 ^b	4.61	240	16.00 ^c	4.29	480	22.86 ^{b,c}	6.68
Words per clause		6.37	0.61		6.46	0.84		6.30	0.70
Words per T-unit		9.93	1.90		9.96	2.13		8.74	1.73
Clauses per T-unit		1.55	0.21		1.54	0.23		1.39	0.22
Mean segmental type-token ratio		0.69	0.05		0.67	0.05		0.68	0.05

^a Statistically significant difference between groups and pairs ($p < .017$).

^b Statistically significant difference between groups and individuals ($p < .017$).

^c Statistically significant difference between pairs and individuals ($p < .017$).

for the ratio of mechanical errors per word: error-free clauses per clause ($U = 37$, $p < .001$), error-free T-units per T-unit ($U = 62.5$, $p = .002$), errors per word ($U = 274$, $p < .001$), grammatical errors per word ($U = 271.5$, $p < .001$), vocabulary errors per word ($U = 274$, $p < .001$).

However, contrary to expectations, no significant differences in terms of accuracy were found between the texts written by the pairs and those written by the individual learners. Although pairs obtained better scores than individual learners on all the accuracy measures—except for the ratio of mechanical errors per word—none of these differences were of statistical significance.

Table 3 presents the results of the fluency and complexity analyses. As explained in the previous section, fluency was measured by the number of words. The comparative analysis of the texts written by the 15 groups and the 15 pairs yielded no statistically significant difference in terms of fluency. However, the texts written individually were considerably longer than those written collaboratively. The mean number of words per text for individual learners was about 193, whereas for groups it was 162, and for pairs 154. Differences in the number of words per text produced by the pairs and the individual learners were statistically significant ($U = 245.5$, $p = .005$), whereas differences between groups and individuals were marginally significant ($U = 226$, $p = .028$) (Table 3).

In terms of both syntactic and lexical complexity, the texts written in groups and in pairs were almost identical. In particular, the ratios of words per T-unit and clauses per T-unit were strikingly similar. The texts written collaboratively had, on average, one more word per T-unit than those written individually, which seems to suggest increased complexification in favor of group and pair work. However, the comparative analyses of group and individual writing, as well as pair and individual writing, yielded no statistically significant difference on any of the complexity measures.

In sum, in relation to the first question of the study, the texts written by groups were significantly more accurate than those written by pairs, but similar in terms of fluency and complexity. The texts written individually were considerably longer than those written in pairs or in groups, but similar in all the complexity measures. They were, however, significantly less accurate than those written in groups and also less accurate than those written in pairs, although these differences were not statistically significant.

Research question 2

To answer the second question of the study, the audio-recorded oral interactions between the groups and the pairs as they collaborated to write their texts were analyzed for frequency, focus, and outcome of LREs. As seen in Table 4, LREs were rather frequent in both small group and pair interaction. Groups produced a total of 736 LREs and pairs 505 LREs. The results of the Independent-samples Mann–Whitney U Test revealed that this difference was statistically significant ($U = 59.5$, $p = .028$).⁵ Although groups spent slightly more time on task, the analysis of LREs per minute confirmed that LREs were more frequent in small group interaction than in pair interaction ($U = 62$, $p = .036$).

⁵ Since only one comparison was made for each dependent variable, alpha was set at the standard $p < .05$ for all statistical tests conducted in relation to the second research question.

Table 4

Frequency of LREs in group and dyad interaction.

	Groups (<i>n</i> = 15)			Pairs (<i>n</i> = 15)		
	Total	Mean	SD	Total	Mean	SD
LREs	736	49.07*	20.79	505	33.67*	15.73
Minutes	373	24.87	2.97	349	23.27	4.37
LREs per minute		1.93*	0.65		1.42*	0.56

* Statistically significant difference ($p < .05$).

Table 5

Focus of LREs in group and dyad interaction.

	Groups (<i>n</i> = 15)				Pairs (<i>n</i> = 15)			
	Total	Mean	SD	%	Total	Mean	SD	%
Form-focused LREs	347	23.13	10.33	47.51%	243	16.20	8.74	48.12%
Lexis-focused LREs	336	22.40	13.94	45.65%	245	16.33	7.45	48.51%
Mechanics-focused LREs	53	3.53	2.82	7.20%*	17	1.13	1.30	3.37%*

* Statistically significant difference ($p < .05$).

It should be noted that differences were observed not only between the two conditions, group and pair work, but also within each of them. Although the average number of LREs per group was 49, one group produced only 19 LREs. Similarly, one of the pairs produced only 11 LREs, even though the average number was 34. Despite this variability, most of the groups produced a higher number of LREs than the pairs.

In terms of focus, both pairs and groups paid similar attention to grammar and lexis. 47.15% of the LREs produced by the groups focused on grammar and 45.65% on lexis. Similarly, 48.12% of the LREs in the dyads were form-focused and 48.51% were lexis-focused. Groups produced a higher number and percentage of mechanical LREs than pairs and this difference was statistically significant ($U = 56$, $p = .018$). However, overall mechanical LREs were rather infrequent. Only 53 mechanics-focused LREs occurred in small group interaction and 17 in pair interaction (Table 5).

Finally, Table 6 presents the results of the outcome analysis. Clear differences can be observed between the groups and the pairs in the resolution of their LREs. Groups and pairs produced a similar number of unresolved LREs, 84 versus 78, and exactly the same number of incorrectly resolved LREs, 104. But groups were able to resolve correctly a total of 548 LREs, 74.46% of the LREs they produced, whereas pairs only reached a correct solution for 323 LREs, 63.96% of the total. The Independent-samples Mann–Whitney U Test confirmed that differences in the percentage of correctly resolved LREs were statistically significant ($U = 62.5$, $p = .038$) (Table 6).

In sum, the number of participants in the interaction did not have much influence on the focus of the LREs, but affected positively their frequency and outcome. Despite some individual variation, overall learners working in groups of four focused their attention on language more often than learners working in dyads and they were also more successful at solving their language-related problems.

Table 6

Outcome of LREs in group and dyad interaction.

	Groups (<i>n</i> = 15)				Pairs (<i>n</i> = 15)			
	Total	Mean	SD	%	Total	Mean	SD	%
Correctly resolved LREs	548	36.53	16.61	74.46%*	323	21.53	10.42	63.96%*
Unresolved LREs	84	5.60	3.52	11.41%	78	5.20	3.36	15.45%
Incorrectly resolved LREs	104	6.93	3.51	14.13%	104	6.93	4.40	20.59%

* Statistically significant difference ($p < .05$).

Qualitative analysis

In order to understand why groups were more successful at solving linguistic difficulties than pairs, the nature of their LREs was further analyzed. This analysis revealed that groups were able to reach a correct solution to a higher percentage of their problems because they had more linguistic resources than pairs, since in small group interaction up to four different learners could share their knowledge to solve the problems encountered.

Instances of collective scaffolding (Donato, 1994), in which three or four learners pool their linguistic resources to co-construct a grammatical structure or utterance that is beyond their individual level of competence, were relatively frequent in the data. The following two examples illustrate this process.

In Example 6, Jane points out that the verb *recomendó* (recommended) needs to be followed by a subjunctive—turn 1. She proposes *vaya*, third-person singular present subjunctive of the verb *ir* (to go)—turn 3. Kim notices that a past rather than a present tense is needed here—turn 4, but neither Jane nor Kim are able to form the third-person singular past subjunctive of *ir*. A third learner, Mary, offers this form, *fuera*?—turn 8, immediately accepted by the other two learners—turns 9 and 10.

Example 6

Small group interaction:

- 1 Jane: *recomendó que: ella: ... es en sub- subjuntivo? ... después de: ... recomendó que?*
[he recommended that she ... is it in sub- subjunctive? ... after ... he recommended that?]
- 2 Mary: *sí sí*
[yes yes]
- 3 Jane: *que: ella: uh ... vaya? a: um: ... el sur*
[that she uh ... goes (present subjunctive) to um ... the south]
- 4 Kim: *pero es en el pasado entonces es: u:h*
[but it is in the past so it is uh]
- 5 Jane: *oh sí uh*
[oh yes uh]
- 6 Kim: *que ella mm*
[that she mm]
- 7 Jane: *mm:*
- 8 Mary: *fuera?*
[she went? (past subjunctive)]
- 9 Kim: *fuera*
[she went (past subjunctive)]
- 10 Jane: *sí, fuera:*
[yes, she went (past subjunctive)]

Written text:

“*Su camarero recomendó que ella fuera al sur de México*”

[Her waiter recommended her to go to the south of Mexico]

In Example 7 we can see four learners scaffolding each other to produce *llovía*. *Llover* (to rain) is a stem-changing verb. In turn 1 David questions whether the correct stem for the past is *lluv-* or *llov-*. Mark offers the right stem, *llovó*?—turn 4, but making an error in the ending. Since *llover* is an *-er* verb the correct ending for the third-person singular preterit is *-ió*. Sarah corrects this error—turn 5, but without realizing that the imperfect rather than the preterit tense is here needed. David notices the error and is now able to produce the correct form of the verb: *llovía*—turn 8.

Example 7

Small group interaction:

- 1 David: *u:h ... llovía ... or llov-*
[uh ... it rained ... or it rain-]
[...]
- 2 Mark: *llu-*
[rain-]
- 3 Anne: *llu-*
[rain-]
- 4 Mark: *llo:vó?*
[it rained (preterit)]
- 5 Sarah: *llovió?*
[it rained (preterit)]

- 6 David: **llo:**
[rain-]
- 7 Sarah: **llov-**
[rain-]
- 8 David: or **llovía**
[or it rained (imperfect)]
- 9 Mark: **llovía** *mucho*
[it rained (imperfect) a lot]
- 10 David: **llovía** . . . mucho
[it rained (imperfect) . . . a lot]

Written text:

“**Llovía** mucho”

[It was raining a lot]

As described by Donato (1994) and Ohta (2000, 2001), the learners in Examples 6 and 7 are individually novices but collectively experts. In other words, there is no identifiable expert. Instead, the different members of the group pool their incomplete L2 knowledge to reach a solution to the language problem encountered and co-construct an utterance that none of them seemed to be able to produce on their own.

The analysis of small group interaction also revealed that, when two or more learners lacked the linguistic resources needed to make accurate use of the language, the help provided by just one other learner could guide the whole group towards accuracy and a higher level of performance. In Example 8 three different learners are incorrectly using the masculine article *los* with the feminine noun *respuestas* (answers)—turns 1, 3, and 4. None of them notices the error until a fourth learner points it out: *las, las respuestas*—turn 5. The first three learners modify their initial output in order to incorporate this correction and the correct feminine article *las* is finally included in their written text.

Example 8

Small group interaction:

- 1 David: *todos los* . . . *respuestas*
[all the (masculine) . . . answers]
- 2 Sarah: no s- heh heh
- 3 Anne: *todos los*
[all the (masculine)]
- 4 Mark: **los respuestas**
[the (masculine) answers]
- 5 Sarah: **las, las respuestas**
[the (feminine), the (feminine) answers]
- 6 Anne: **las**
[the (feminine)]
- 7 David: **las? las respues-**
[the? (feminine) the (feminine) answ-]
- 8 Mark: **las respuestas**
[the (feminine) answers]
- 9 Anne: **las respuestas**
[the (feminine) answers]
- 10 David: **las respuestas**
[the (feminine) answers]

Written text:

“Sabía **las** respuestas de todos sus problemas”

[He knew the answers to all her problems]

Even when linguistic problems could be solved by just two learners, a larger number of participants in the interaction helped to create opportunities for repeated and, in this way, enhanced input. In Example 9, Kim asks for the word *avión* (plane)—turn 1, which is provided by two of her peers, Mary and Jane—turns 2 and 3. This repeated input is noticed and accepted by Kim—see turn 5.

Example 9

Small group interaction:

- 1 Kim: *cómo se dice* **plane?**
[how do you say plane?]
- 2 Mary: **avión**
[plane]

- 3 Jane: e:h **avión**
[eh plane]
4 Mary: sí
[yes]
5 Kim: **avión?** **avión** mm
[plane? plane mm]

Written text:

“*Estaba en el avión para seis horas*”

[She was on the plane for six hours]

In Example 10, Erin corrects Donna’s use of the verb *llamar* (to call), which needs to be followed by the preposition *a*—turn 2. Donna either does not notice or does not accept this feedback. But when in turn 8 a third learner, Becky, repeats Erin’s correction, *llamó a! su hermana*, emphasizing the preposition *a*, the corrective feedback gets reinforced and is finally noticed and accepted by Donna—see turns 10 and 12.

Example 10

Small group interaction:

- 1 Donna: *ok, frase, por favor, inmediatamente llamó: su*
[ok, sentence, please, immediately she called (missing preposition)
his]
2 Erin: **a:** *hermano?*
[(preposition) brother?]
3 Kelly: *su hermana*
[(missing preposition) her sister]
4 Donna: *su herma:na?*
[(missing preposition) her sister?]
5 Kelly: *su casa de hermana*
[(missing preposition) her sister’s house]
6 Donna: *hmm?*
7 Kelly: *er*
8 Becky: *es llamó a! su hermana*
[it is she called (preposition)! her sister]
9 Kelly: *um yeah*
10 Donna: **a?**
[(preposition)]
11 Becky: **a!** *hermana*
[(preposition)! sister]
12 Donna: **a** *su hermana . . . y:*
[(preposition) her sister ... and]

Written text:

“*Inmediatamente, llamó a su hermano*”

[She immediately called her brother]

These different examples illustrate how learners working in groups of four were sometimes able to reach a level of performance that seemed to be not only beyond their individual level of competence, but also beyond what they might have been able to achieve had they been working in pairs. Small group interaction offered opportunities for peer collaboration and co-construction of language knowledge that were not only quantitatively but also qualitatively different from those observed in pair interaction.

However, in some of these examples we can also observe that in group interaction LREs did not always involve the active participation of the four members of the group—see Examples 6 and 9, and also 1 and 4. Whereas most learners in the groups were very active, some adopted a more passive role. As expected, in groups of four learners opportunities to participate were more limited than in dyads, and it was easier for one student to remain silent and become an observer of the work that the other learners were doing. The effect that the resulting pattern of interaction may have had on the occurrence and resolution of LREs is yet to be explored.

Discussion

The first question addressed in the present study concerned the relationship between the number of participants in a writing task and the accuracy, fluency, and complexity of the written text produced. The comparative analysis of texts written by learners working in groups of four, pairs, and individually revealed a positive effect for collaboration on

linguistic accuracy. It also showed that, when assigned the same amount of time, learners writing alone produced longer texts than learners writing either in groups or in pairs. In terms of both syntactic and lexical complexity, no clear differences were found between the three conditions.

The lack of significant differences in complexity between collaborative and individual writing had already been observed in previous research comparing pair and individual work (Storch, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009). This research also noticed that learners writing in pairs needed more time to complete a writing task than learners writing alone (Storch, 1999, 2005; Storch & Wigglesworth, 2007). In the present study all the learners completed the task under the same classroom conditions and were therefore assigned the same amount of time. Learners working collaboratively needed to agree not only on the content of their stories but also on the language to be used in their texts. As illustrated by the analysis of LREs, this often resulted in relatively lengthy discussions, which helps to explain why they produced shorter texts than individual learners.

Previous research also found that learners writing in pairs produced linguistically more accurate texts than those writing alone (Storch, 1999, 2005; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009). Similarly, in the current study, texts written collaboratively were overall more accurate than those written individually. Differences in accuracy between pairs and individual learners did not reach the level of statistical significance, but, since only 15 pairs and 21 individual learners participated in the study, the lack of statistically significant differences may be related to the small sample size. On the other hand, it was found that the texts written in small groups contained significantly fewer errors not only than those written individually but also than those written in dyads. These results suggest that the effect of collaboration on accuracy may be related to the number of participants in the activity, and in this way contribute to our understanding of collaborative writing tasks.

In order to explain these findings, attention was paid to the oral interactions between the pairs and the groups as they collaborated to write their texts. The analyses conducted to answer the second question of the study revealed that learners working in small groups focused their attention on language more often than learners working in pairs. They produced more LREs and a higher percentage of these LREs were correctly resolved. Still, learners working in pairs also produced a considerable number of LREs and were able to reach a correct solution for many of their problems. As seen in the examples above, most of the solutions to the LREs were directly transferred into the texts, and, as a result, texts written collaboratively contained fewer errors than those written individually.⁶

It should also be noted that, even though most of the groups produced more LREs than the pairs, differences in LRE frequency were observed not only between the two conditions, pair and group work, but also within each of them. Similar variability had already been documented in previous studies of dyadic interaction (e.g., Storch, 2005; Storch & Wigglesworth, 2007; Swain & Lapkin, 1998; Watanabe & Swain, 2007; Wigglesworth & Storch, 2009) and explained in relation to differences in patterns of interaction (Kim & McDonough, 2008; Storch, 2001, 2002, 2004; Watanabe & Swain, 2007, 2008). This research found that collaborative problem-solving activities were more likely to occur when all the learners adopted a collaborative orientation and were willing to share ideas and engage with each other's contributions. When at least one of the learners adopted either a dominant or a passive attitude, the resulting pattern of interaction tended to correlate with lower LRE frequency. The results of the current study confirm that not all peer interaction, whether in pairs or in small groups, can be expected to offer the same opportunities for scaffolded assistance and co-construction of knowledge.

The analysis of interaction also revealed that, whereas both pairs and groups produced a similar percentage of grammatical and lexical LREs, mechanical LREs were rather infrequent in the data. At the same time, the analysis of written texts revealed differences between pairs, groups, and individual learners in relation to grammatical and lexical accuracy, but not mechanical accuracy. It seems that learners writing collaboratively discussed and reached mutually agreed upon decisions on their use of grammar and vocabulary, but most spelling, accentuation, and punctuation decisions were individually made by the learner ultimately writing the text.⁷ Therefore, collaboration did not affect the mechanics of the written texts.

⁶ As learners discussed the content and organization of their stories, they also produced LREs focused on lexical items and grammatical structures that, in the end, did not appear in their texts.

⁷ Learners were free to decide who would write their story. Most pairs and groups selected a learner who wrote the entire text, but in two groups and in one pair, learners took turns in writing.

Mechanical LREs have also been fairly uncommon in most previous research (e.g., Storch, 2007; Storch & Wigglesworth, 2007; Wigglesworth & Storch, 2009). However, the distribution of lexical and grammatical LREs varies among studies depending on the nature of the task. In the current study, the task demanded learners' use of Spanish past tenses, a frequent source of difficulty for English-speaking learners of Spanish, and the use of some uncommon lexical items, such as fortuneteller, gas mask, or lawnmower (see Appendix A). It was specifically designed to create both grammatical and lexical difficulties, and in this way elicit both form-focused and lexis-focused LREs.

Finally, the qualitative analysis of LREs confirmed that the higher level of success achieved by the groups was quite often the result of the different members sharing their knowledge and collaborating to solve their problems, rather than just the impact of one single strong student—see, for instance, Examples 6 and 7. In groups, up to four learners could pool their linguistic resources to solve language-related problems. At least in the context of the present study, more learners meant more resources and subsequently more chances to reach a correct solution to the problems encountered. This also provides new insights for the study of LREs, suggesting a positive effect for the number of participants on the outcome of collaborative problem-solving activity.

However, in collaborative writing tasks not all learners can be expected to contribute equally to the solution of the problems or the final written product. In the present study, Examples 1, 4, 6, and 9 show how in groups of four learners, sometimes LREs were resolved without the active participation of all the members. In these examples, one of the learners acted as an observer of the other learners' interaction. Although pair work is expected to encourage participation (Swain, 2001, p. 59), previous research on dyads has documented similar differences among individual learners on their level of engagement and the roles they adopt when performing collaborative tasks and working in the solution of language-related problems (e.g., Kim & McDonough, 2008; Storch, 2001, 2002, 2004; Watanabe & Swain, 2007, 2008). Analyzing learners' roles and attitudes, Storch identified four different patterns of dyadic interaction: collaborative, expert/novice, dominant/passive, and dominant/dominant (Storch, 2001, 2002, 2004). Watanabe and Swain (2007) added one more pattern: expert/passive. As already discussed, the first two patterns have been found to facilitate the occurrence of LREs and the co-construction of knowledge, whereas the other three, involving a dominant and/or passive learner, seem to be less favorable for collaborative problem-solving activity. The results of the present study suggest that similar research needs now to be conducted on groups of more than two learners, where a larger number of participants may result in a higher complexity of patterns of interaction that may affect the frequency and nature of LREs in a variety of ways.

Conclusions

The current study provides evidence of the benefits of collaborative work on written production and in this way offers additional support for the use of collaborative writing tasks in the L2 classroom. Collaboration, whether in pairs or in small groups, resulted in greater grammatical and lexical accuracy. Although group work offered fewer opportunities for individual participation, it had a positive impact on collaborative dialogue. Learners working in small groups paid more attention to language and were more successful at solving language-related problems than learners working in pairs. Subsequently, they were also linguistically more accurate. Therefore, both group and pair writing assignments should have their place in the classroom.

The analysis of pair and small group interaction also showed how the collaborative writing task designed for the purposes of the present study served to create opportunities for learners to question their language use, test and confirm hypotheses, offer and assess new input, and provide both positive and negative feedback to each other. Previous researchers have claimed that these language-mediated activities represent language learning in progress (e.g., Kim, 2008; Lapkin et al., 2002; Storch, 2002; Swain et al., 2002; Swain & Lapkin, 1998, 2002). However, the current study did not examine the relationship between LREs and L2 learning. Since previous studies providing evidence of the impact of LREs on learning have been mostly focused on dyadic interaction, further research needs now to be conducted on small group interaction. This research will need to analyze whether the higher frequency of correctly resolved LREs observed for the groups represents also more language learning opportunities. It should also investigate whether in small group interaction, where learners have fewer opportunities for active participation, all the members of the group can still benefit from LREs, even when they are acting as observers of other learners' collaborative problem-solving activity—as seen in Examples 1, 4, 6, and 9.

Finally, it should also be noted that, since the present study focused on intermediate level learners and analyzed their performance on only one type of collaborative writing task, the results obtained cannot be generalized across task types or proficiency levels. An open issue for future research is how the number of participants may interact with task

features and learner-related factors to influence the opportunities that peer interaction offers for collaboration and collaborative dialogue.

Appendix A

See Fig. A.1.

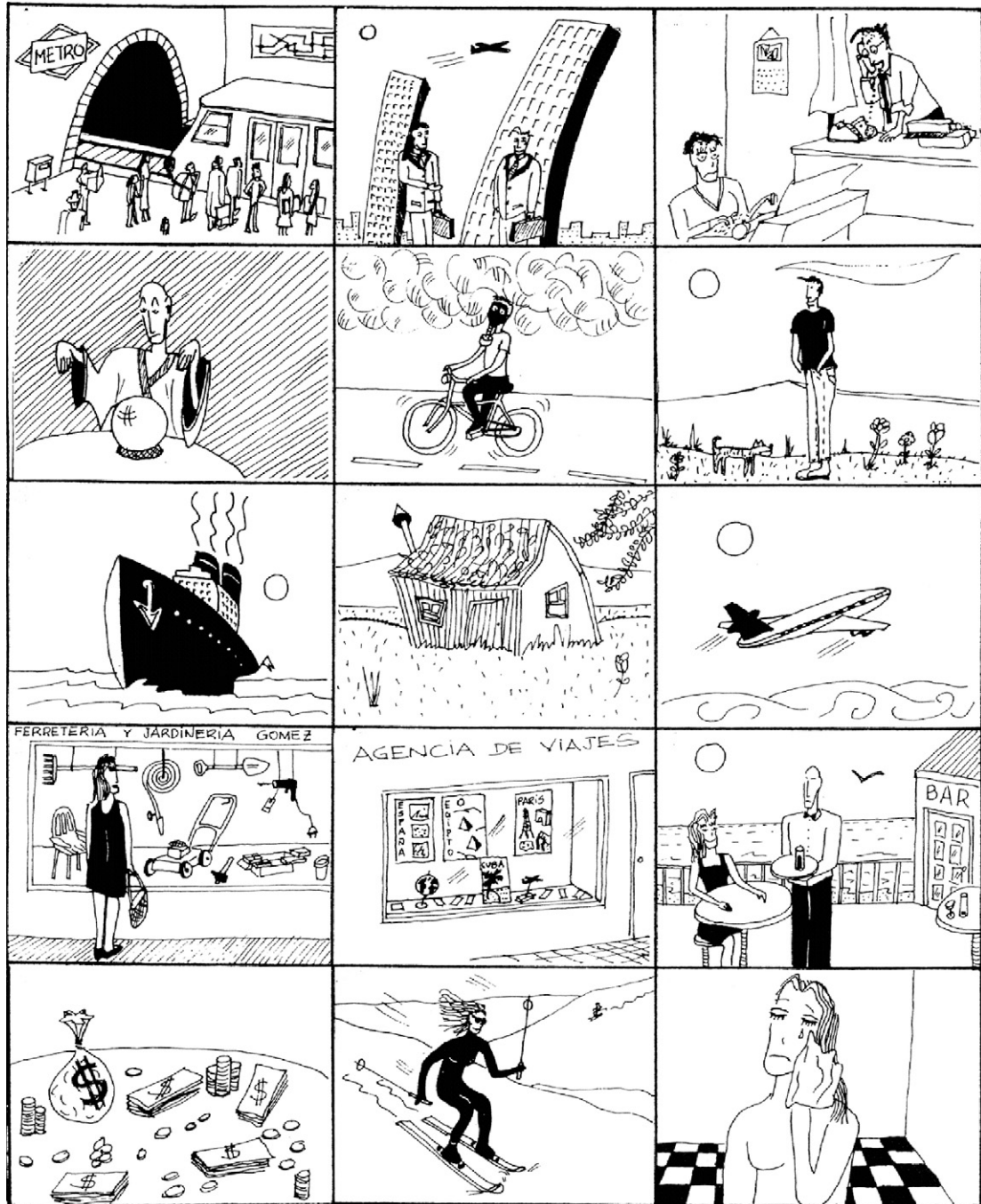


Fig. A.1. Pictures.

González Sáinz, T. (1999). *Juegos comunicativos. Español lengua extranjera* (p. 87). Madrid: SM.

References

- Alegría de la Colina, A., & García Mayo, M. P. (2007). Attention to form across collaborative tasks by low proficiency learners in an EFL setting. In M. P. García Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 91–116). Clevedon: Multilingual Matters.
- Antón, M., & DiCamilla, F. (1998). Socio-cognitive functions of L1 collaborative interaction in the L2 classroom. *The Canadian Modern Language Review*, 54, 314–342.
- Bygate, M., Skehan, P., & Swain, M. (Eds.). (2001). *Researching pedagogic tasks: Second language learning, teaching, and testing*. London: Pearson.
- Donato, R. (1994). Collective scaffolding in second language learning. In J. P. Lantolf & G. Appel (Eds.), *Vygotskian approaches to second language research* (pp. 33–56). Norwood, NJ: Ablex.
- Ellis, R. (2003). *Task-based language learning and teaching*. Oxford: Oxford University Press.
- Ellis, R., & Barkhuizen, G. (2005). *Analysing learner language*. Oxford: Oxford University Press.
- Ewald, J. (2005). Language-related episodes in an assessment context: A ‘small-group quiz’. *The Canadian Modern Language Review*, 61, 565–586.
- García Mayo, M. P. (Ed.). (2007). *Investigating tasks in formal language learning*. Clevedon: Multilingual Matters.
- Kim, Y. (2008). The contribution of collaborative and individual tasks to the acquisition of L2 vocabulary. *The Modern Language Journal*, 92, 114–130.
- Kim, Y. (2009). The role of task complexity and pair grouping on the occurrence of learning opportunities and L2 development. Unpublished Ph.D. dissertation, Northern Arizona University, Flagstaff.
- Kim, Y., & McDonough, K. (2008). The effect of interlocutor proficiency on the collaborative dialogue between Korean as a second language learners. *Language Teaching Research*, 12, 211–234.
- Kuiken, F., & Vedder, I. (2002). The effect of interaction in acquiring the grammar of a second language. *International Journal of Educational Research*, 37, 343–358.
- Lapkin, S., Swain, M., & Smith, M. (2002). Reformulation and the learning of French pronominal verbs in a Canadian French immersion context. *The Modern Language Journal*, 86, 485–507.
- Leeser, M. J. (2004). Learner proficiency and focus on form during collaborative dialogue. *Language Teaching Research*, 8, 55–81.
- Nassaji, H., & Tian, J. (2010). Collaborative and individual output tasks and their effects on learning English phrasal verbs. *Language Teaching Research*, 14, 397–419.
- Norris, J., & Ortega, L. (2009). Towards an organic approach to investigating CAF in instructed SLA: The case of complexity. *Applied Linguistics*, 30, 555–578.
- Nunan, D. (1989). *Designing tasks for the communicative classroom*. Cambridge: Cambridge University Press.
- Ohta, A. S. (2000). Rethinking interaction in SLA: Developmentally appropriate assistance in the zone of proximal development and the acquisition of L2 grammar. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 51–78). Oxford: Oxford University Press.
- Ohta, A. S. (2001). *Second language acquisition processes in the classroom: Learning Japanese*. Mahwah, NJ: Lawrence Erlbaum.
- Ortega, L. (2009). Studying writing across EFL contexts: Looking back and moving forward. In R. M. Manchón (Ed.), *Writing in foreign language contexts. Learning, teaching, and research* (pp. 232–255). Clevedon: Multilingual Matters.
- Skehan, P. (2009). Modelling second language performance: Integrating complexity, accuracy, fluency, and lexis. *Applied Linguistics*, 30, 510–532.
- Storch, N. (1998). A classroom-based study: Insights from a collaborative text reconstruction task. *ELT Journal*, 52, 291–300.
- Storch, N. (1999). Are two heads better than one? Pair work and grammatical accuracy. *System*, 27, 363–374.
- Storch, N. (2001). How collaborative is pair work? ESL tertiary students composing in pairs. *Language Teaching Research*, 5, 29–53.
- Storch, N. (2002). Patterns of interaction in ESL pair work. *Language Learning*, 52, 119–158.
- Storch, N. (2004). Using activity theory to explain differences in patterns of dyadic interactions in an ESL class. *The Canadian Modern Language Review*, 60, 457–480.
- Storch, N. (2005). Collaborative writing: Product, process and students’ reflections. *Journal of Second Language Writing*, 14, 153–173.
- Storch, N. (2007). Investigating the merits of pair work on a text editing task in ESL classes. *Language Teaching Research*, 11, 143–159.
- Storch, N. (2008). Metatalk in a pair work activity: Level of engagement and implications for language development. *Language Awareness*, 17, 95–114.
- Storch, N., & Wigglesworth, G. (2007). Writing tasks: Comparing individual and collaborative writing. In M. P. García Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 157–177). London: Multilingual Matters.
- Storch, N., & Wigglesworth, G. (2010). Learners’ processing, uptake, and retention of corrective feedback on writing. *Studies in Second Language Acquisition*, 32, 303–334.
- Strauss, P., & Alice, U. (2007). Group assessments: Dilemmas facing lecturers in multicultural tertiary classrooms. *Higher Education Research & Development*, 26, 147–161.
- Swain, M. (2000). The output hypothesis and beyond. In J. P. Lantolf (Ed.), *Sociocultural theory and second language learning* (pp. 97–114). Oxford: Oxford University Press.
- Swain, M. (2001). Integrating language and content teaching through collaborative tasks. *The Canadian Modern Language Review*, 58, 44–63.
- Swain, M. (2006). Linguaging, agency and collaboration in advanced language proficiency. In H. Byrnes (Ed.), *Advanced language learning: The contribution of Halliday and Vygotsky* (pp. 95–108). New York: Continuum.
- Swain, M., Brooks, L., & Tocalli-Beller, A. (2002). Peer–peer dialogue as means of second language learning. *Annual Review of Applied Linguistics*, 22, 171–185.
- Swain, M., & Lapkin, S. (1998). Interaction and second language learning: Two adolescent French immersion students working together. *The Modern Language Journal*, 82, 320–337.

- Swain, M., & Lapkin, S. (2001). Focus on form through collaborative dialogue: Exploring task effects. In M. Bygate, P. Skehan, & M. Swain (Eds.), *Researching pedagogic tasks: Second language learning, teaching and testing* (pp. 99–118). London: Longman.
- Swain, M., & Lapkin, S. (2002). Talking it through: Two French immersion learners' response to reformulation. *International Journal of Educational Research*, 37, 285–304.
- Swain, M., & Watanabe, Y. (2012). Linguaging: Collaborative dialogue as a source of second language learning. In C. Chapelle (Ed.), *The encyclopedia of applied linguistics*. Oxford: Wiley-Blackwell, in press.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Watanabe, Y., & Swain, M. (2007). Effects of proficiency differences and patterns of pair interaction on second language learning: Collaborative dialogue between adult ESL learners. *Language Teaching Research*, 11, 121–142.
- Watanabe, Y., & Swain, M. (2008). Perception of learner proficiency: Its impact on the interaction between an ESL learner and her higher and lower proficiency partners. *Language Awareness*, 17, 115–130.
- Wigglesworth, G., & Storch, N. (2009). Pair versus individual writing: Effects on fluency, complexity and accuracy. *Language Testing*, 26, 445–466.
- Williams, J. (1999). Learner-generated attention to form. *Language Learning*, 49, 583–625.
- Williams, J. (2001). The effectiveness of spontaneous attention to form. *System*, 29, 325–340.
- Zeng, G., & Takatsuka, S. (2009). Text-based peer-peer collaborative dialogue in a computer-mediated learning environment in the EFL context. *System*, 37, 434–446.

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